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Plastic Plus Stainless-Steel Fibers Make Resilient, Impermeable Material

The problem: In the area of seals, packing, and certain bearing applications it is desirable to have components that are soft enough to deform under load but resilient enough to return to original configuration when load is removed. Normally, plastics that fulfill the first requirement suffer from permanent deformation under load.

The solution: A material that is made by combining plastic material with stainless-steel fibers and forming any desired configuration by molding the material under heat and pressure.

How it's done: Stainless-steel fibers, preferably in crinkled-ribbon form, between 1/8- and 1/4-inch long are combined with tetrafluoroethylene fluorocarbon resin, kneaded, oven-dried, unraveled, cold-pressed and then molded into the desired size and shape under heat and pressure.

Notes:

1. Proportion of stainless-steel fibers may be varied from 10% to 90% by weight with respect to the resin to cover a wide range of applications.

2. Mixing may be either a dry process or by liquid dispersion.
3. The composite material is substantially impermeable to all liquids and most gases. Addition of gold flakes to the mixture will minimize slow seepage of gases such as N_2O_4 .
4. Addition of bronze or silver powder, particularly near the surface, enhances the material for use in bearing applications.

Patent status: Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)), to TRW Space Technology Laboratories, One Space Park, Redondo Beach, California.

Source: Johannes R. Smirra of TRW Space Technology Laboratories under contract to Western Operations Office (WOO-246)

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